Field System Log File Format

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This document describes the general structure of the Field System (FS) log file format. The details of the contents of the log file entries (lines) are not found here, but can be found in the **SNAP Language** and **Control Files and Field System Initialization** manuals. The information here is current as of FS version 9.7.7. However, it is also applicable in most respects for previous versions, including pre-9.0.0. The most significant recent changes were in the time-tag format in version 9.4.0 and the addition of the Log Opened entry in version 9.0.4. The section titled **Format of Log Entries** is an expansion of Section 2.3 in the **logex: Examine Mark III Log Files** manual.

File-name format

The file name for FS logs is in the following form:

> *name*`.log`

where:

name   is up to eight alphanumeric characters. For experiments, this consists of the up to six character experiment code followed by the two character station code.

`log`   is the literal three lower case letters of the file name extension "`log`".

Format of Log Entries

The log file is organized as a series of variable length lines of character data. Usually, only printable characters are used. Each line has the following structure (no spaces before or between fields):

> *timetypedata*

Where

time   is a time-tag representing the time the entry was made

type   is a single character indicating the type of entry, one of:

> :   command statement from a schedule file or preamble line
> ;   command from the operator

@	time scheduled command
$	command from within a SNAP procedure
?	error message
&	contents of a SNAP procedure
/	response to a command
#	log entry from a non-FS (external) program

For identification purposes, entries for the contents of procedures (type &
entries) and commands issued from within a SNAP procedure (type $
entries) also have the procedure name followed by a slash (/) before their
data field.

The contents of a SNAP procedure (type & entries) are logged only the
first time the procedure is executed since the log was most recently opened
or if procedure has been modified after the previous logging.

The command issued from within a SNAP procedure (type $ entries) are
only logged if extended logging is turned on, see the **Extended
Logging** section below. In any event, the responses from commands in
procedures do not have the additional procedure name followed by a slash
(/); they are always logged as "normal" responses.

Log entries made by programs external to the FS (type # entries) are
identified further by having the entry preceded by the program name (5
characters maximum) and another # character.

data   The *data* part of the log entry contains the SNAP command, response,
etc. Possible formats for non-Log Opened, non-Preamble, non-Error
message entries are:

```
command/parm,parm,…
command=parm,parm,…
command
program#data
```

where *command* is a command name, *procedure* is a SNAP procedure
name, and the *program* is an external program name. *parm* is one of a
series of parameter values. Parameters may be characters, integers, or
floating point numbers. The / indicates a response to a command, the =
indicates a command to set the parameters. When the command appears
without parameters, it is a request for a response. Please refer to the
SNAP Language manual for more details.

`Log Opened` entries *data* part consists of:

> `Log Opened:` *text*

Where `Log Opened:` is the literal text "Log Opened:"; *text* is text that identifies the program and version number that opened the file to write to it. The final token in *text* is the version number.

Preamble entries appear immediately after a `Log Opened` entry and have a type of `:` with a *data* part consisting of:

> *file,parm,parm,…*

where *file* is the main part of the FS control file name (excluding the `.ctl` extension) that is being logged. There may be one or more digits appended to the file name if more than one Preamble entry is used for the file. *parm* is one of a series of parameter values from the file.

Error message entries *data* part consist of:

> `ERROR` *cc dddd text*

Where `ERROR` is the literal text "ERROR", *cc* is a two character mnemonic for the command or sub-system of the FS that reported the error, *dddd* is the integer value (usually negative) of the specific error, and *text* is additional explanatory text.

Time-tag Format

Each line the FS log starts with a 20 characters time-tag which represents the time that the entry was made. All times/dates are in Universal Time. The time-tags normally run monotonically forward in time, but there may be backward jumps if the FS time is reset. The format is:

> *yyyy.ddd.hh:mm:ss.ss*

where:

yyyy	is the four digit year
ddd	is the three digit day-of-year, with leading zeros as needed
hh	is the hours of the day, with leading zeros as needed
mm	is the minute, with leading zeros as needed
ss.ss	is the seconds to 0.01 seconds resolution, with leading zeros as needed

An example is "`2006.252.08:34:17.54`".

Opening Line and Preamble Lines

Each time a log file is opened, including when it is initially created by the FS, a `Log Opened` line is added to the file, and the parameters (contents) of some of the FS control files are recorded in Preamble lines immediately afterwards. The values of these parameters can only be changed when the FS is restarted and the control files are re-read. The `Log Opened` and Preamble lines are described in the **Format of Log Entries** section above.

End of Log File

A normal last entry in a log file is one of:
- a `log=...` command changing recording to a new log file
- a `schedule=...` command starting execution of a schedule (implicitly opening a new log file)
- a `*boss terminated` line indicating the FS was stopped.

One of these should also appear before any `Log Opened` line after the first line in a log file. Any other entry at the end of the file or before a `Log Opened` line indicates that the file was not closed normally.

Extended Logging

Commands executed from inside procedures and the responses of commands that contain only positive acknowledgements are not normally logged. This behavior is changed in some cases in order to provide a more complete description of the order of events by enabling extended logging with the SNAP command `xlog=on`. Extended logging continues until it is disabled with the SNAP command `xlog=off` or the FS is stopped. Turning on extended logging also adds the additional output to the operator display. There is another similar facility called extended display (`xdisp=on/off`), but it does not affect the contents of the log, only what the operator sees on the display.